

In the early years of the current century, potential sources of radiation exposure were few in number and a relatively few people, mostly specialists in radiation, ran risk of incurring radiation damage. Radiological health at this stage did not need to be much more than a series of personal protection measures. As the first half of the 20th century matured, medical, research, and industrial applications of x-rays, radium emanations, and other types of high energy radiations expanded rapidly. Increasing numbers of technicians, radiation workers, radiologists, and even the general public were potentially exposed. Therefore, health activities of the general nature of industrial hygiene procedures for personnel protection from radiation were developed for protection of persons who worked habitually in the vicinity of ionizing radiation sources.

The advent of the atomic age within the current decade, with its radioisotopes, atom bombs, and promise of atomic power has called popular attention to the potential health hazards of radiation. Now, with widespread use of x-ray diagnosis in medicine and industry with increasing employment of radiation therapy in medicine, and with the mushroom-like increase in shipments of artificially radioactive isotopes, the populace has become potentially exposed to radiation levels in excess of those which characterize our natural background. Because man has deliberately increased the available amount of high energy radiation in the world, public health authorities have had thrust upon them the moral responsibility of helping the community to live with radiation without compromising its health.

The Atomic Energy Commission—face to face with the problem in its potentially most serious form—has led the way in developing standards for radiological protection. Its record in this field has been a notable one. Since January, 1947, only five accidents have occurred in its large staff as a result of radiation, all five, burns in handling beta-contaminated materials without following regulations. At Hanford, Calif., and Oak Ridge, Tenn., the average radiation to which the workers as a group are exposed is less than that received by residents of Rocky Mountain cities in the form of cosmic rays. Injuries of all kinds in all A.E.C. plants have averaged less than half the rate for American industry as a whole. The public health engineer will find invaluable hints in the recent report of the Commission¹ outlining in detail the preventive practices which have been introduced in the A.E.C. plants.

Radiological health, from being merely a personal health protection responsibility, has reached the stature of a general public health activity. It behooves all public health workers, governmental and non-governmental, to familiarize themselves with the nature, biological effects and measures for control of ionizing radiation. Local and state health departments as well as the Public Health Service should develop methodologies and practices designed to prevent an adverse effect on the health of the nation by nuclear and machine-produced radiations, as we move forward into this new technological era.

1. *Control of Radiation Hazards in the Atomic Energy Program.* U. S. Atomic Energy Commission. Government Printing Office, July, 1950.

COLIFORM ORGANISMS AND GAS PRODUCTION

SINCE Theobald Smith introduced the gas fermentation test for colon bacilli more than half-a-century ago, tens of thousands of bacteriologists have applied

it to uncounted millions of water samples. It is strange that a fundamental analysis of the processes going on in such tests has not before been made.

Chambers¹ has presented highly significant data with regard to this neglected problem. He finds that the total bacterial population in a fermentation tube inoculated with varying numbers of colon bacilli generally reaches a more or less stable maximum in three hours; and that gas is produced (in at least a 2 mm. bubble) when the population of colon bacilli reaches a mean value of 170 million per ml. in lactose broth. In brilliant green bile broth nearly a 50 per cent greater population is required to produce visible gas.

Chambers concludes that production of gas in any amount in the fermentation tube is highly significant; and points out that colon bacilli actually present may not be revealed if—in the presence of other organisms—the maximum total population level is reached before 170 million colon bacilli per ml. are present.

These results are not likely to affect the use of the coliform test in control of public water supplies. Present standards are not based on the discovery of the ultimate colon bacillus; but on an overwhelming mass of practical experience which shows that the fermentation test, as ordinarily made and interpreted is a reliable measure of safety. They are, however, of fundamental theoretical importance; and may have very practical application in the study of stream pollution problems, where competing non-gas-forming organisms may be present in large numbers.

1. Chambers, C. W. *Pub. Health Rep.* 65:619 (May 12), 1950.

LETTER TO THE EDITOR

TO THE EDITOR,

In regard to your timely editorial on "Nitrates in Well Water and Methemoglobinemia in Infants" (July, 1950, page 866), it seems to me you have overlooked an opportunity to stress the importance and feasibility of prevention of this serious disease. When a disease occurring in the newborn period has an incidence of one per thousand live births and when it is evident that it is a disease which could be prevented by relatively simple means, it seems to me that, while further research should certainly be encouraged, it is more important to urge the adoption of the following measures at least in affected areas:

1. Well water methemoglobinemia should be made a reportable disease.

2. The testing of the private well water supply for nitrate content should become an integral part of the prenatal examination in rural areas. Well water containing more than twenty parts of nitrate per million should be condemned for use in infant feeding.

3. The importance of breast feeding at least in the first two or three months should be stressed, since there has been no report of a proven case in a breast fed baby.

If these measures were publicized and adopted by state and provincial public health bodies, well water methemoglobinemia would become a rarity in a much shorter time and with far smaller expenditure of public funds than would be involved in large-scale reconstruction of hundreds and thousands of wells.

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